

# **MODIS TECHNICAL TEAM MEETING**

**August 22, 1996**

The MODIS Technical Team Meeting was chaired by Vince Salomonson. Present were Bruce Guenther, David Herring, Ed Masuoka, Dave Toll, Richard Weber, Robert Murphy, Bill Barnes, Wayne Esaias, Eric Vermote, and Ray Taylor.

## **1.0 SCHEDULE OF EVENTS**

<b>Aug. 16</b>	<b>Revised ATBDs due to the EOS Project Science Office</b>
<b>Aug. 16</b>	<b>Validation Summary Plans due</b>
Sept. 4 - 5	SDST Science Advisory Panel Meeting at GSFC
Oct. 8	MODIS Calibration Working Group at U. of Maryland University College Conference Center
Oct. 9 - 11	MODIS Science Team Meeting at U. of Maryland University College Conference Center
Oct. 15	EOS Science Software Review
Oct. 17 - 18	SWAMP Meeting

## **2.0 MINUTES OF THE MEETING**

### **2.1 MODIS Project Reports**

Weber reported that he participated in a three-way conference call yesterday with SBRS and the resistor manufacturer. He said the manufacturer plans to start producing new resistor networks to replace the defective ones in the MODIS Protoflight Model (PFM). Weber observed that nearly all of the resistors will be replaced.

Weber announced that the MODIS Project Office has suggested conducting thermal vacuum tests on the PFM in September as a sort of "pre-thermal vacuum" test that will be done in addition to the regularly scheduled thermal vacuum tests. The rationale is that if there are any serious thermal performance issues in MODIS, then it is important to discover them before the December tests. Weber stressed that this pre-thermal vacuum test is not the same as the planned thermal vacuum test. SBRS is considering MODIS Project's suggestion. [\*Note: Subsequent discussions with SBRS showed that this approach will NOT be possible.]

### **2.2 Preliminary Protoflight Model/Engineering Model Electronics (PFM/EM) Data**

Guenther showed a number of charts illustrating preliminary MODIS data obtained with the EM electronics (see Attachment 1). He noted that there is some ghosting and scattered light evident. In this testing, a slit that fills one 1-km band at a time (a 1 x 10 pixel slit), was passed across the MODIS scan mirror.

The data shown were for Band 10, and there seemed to be a small residual scattering effect thought to be ghosting.

Then Guenther showed preliminary data for the near infrared bands. He stated that bands 17, 18, and 19 look fine, but the rest of those bands appear to be “over driven.” These data are obtained when MODIS is cooled with the Bench Test Cooler (BTC). The BTC cools only the coldest or third stage of the flight cooler. The SW/MWIR detectors are sensitive to thermal energy, and receive a large signal from the warm intermediate stages of the flight cooler when it is operated with the BTC. The SW/MWIR bands usually are operating near saturation when testing occurs using the BTC. These bands show much anomalous behavior. Nevertheless, he feels that the visible/near infrared bands performed as MCST expected them to.

Guenther reminded the team that in the EM testing there appeared to be a problem with crosstalk between bands 1 and 2. However, SBRS has implemented a fix and MCST has not yet seen any evidence that this is still occurring. He noted that MCST hasn’t done any analyses yet to show that scattering in the near field is lower than before. He expects the scattering to be lower because SBRS replaced the first dichroic (D1), but in replacing the D1, Guenther feels that a polarization “penalty” was introduced into the system. This effect is most prominent in Band 8.

Guenther stated that the test data so far for the shortwave/midwave (SW/MWIR) bands 22, 23, and 20 are useless because of the high thermal background. Guenther would like to see data from a time when the cooler windows are cold so that he can determine whether SBRS’ fixes since EM testing work, or whether something else must be done. Guenther supports the idea of putting the PFM into the thermal vacuum chamber as soon as possible.

For the longwave infrared bands, Guenther reminded the Team that there was some concern about the scatter and crosstalk problems caused by the cut on the focal plane between bands 27 and 33. SBRS implemented a fix; they painted a black stripe along the inside edges of band 27 and 33 inside the cut. Looking at the latest data, Guenther stated that SBRS’ paint fix appears to have worked. Still, Guenther hopes to get more conclusive data, as those data had a high background temperature.

Guenther reported that the cut between bands 31 and 36 is still a concern. SBRS did not paint that cut and Guenther feels that they will need to if the 2 to 5 percent crosstalk seen in bands 33 - 35 (and probably 36) is to be suppressed.

#### 2.2.1 Upcoming MCST Audits

Guenther announced that he will be at the University of Wisconsin-Madison on Sept. 4 - 5 for the MODIS infrared audit. A second MCST VIS/NIR audit will be held the following week on Sept. 11 - 12 at NASA GSFC.

### **2.3 Follow-on MODIS Update**

Taylor reported that work is continuing on the evaluation of options for continuing MODIS measurements on AM-2. Chris Scolese, EOS AM Project Manager, has directed him to commence work on the design concept of the follow-on MODIS sensor. Taylor said that a baseline schedule has been entered into the POP (Program Operating Plan) cycle for AM-2. He said there is some question as to whether the commercial sector will pickup the cost for the Landsat-type measurements.

Taylor observed that there is a range of options from building a copy of MODIS for AM-2, to building a MODIS-light, to changing to a pushbroom system. Taylor recognized that building a copy MODIS represents the lowest technical risk, lowest cost, lowest science risk, and least amount of change to the science algorithms.

He said that he chaired a meeting to begin planning a design options study for building the advanced MODIS. He expects to have a draft plan by next week, which he will present to the Technical Team. The plan will be developed in collaboration with NOAA, NPOESS, and NASA personnel who are working to assess how the MODIS algorithms will be impacted if a change is made to the pushbroom approach. Taylor plans to send the revised specification for the advanced MODIS out to the Science Team to solicit their inputs.

Murphy asked which will be emphasized: a physically smaller MODIS, or one that is technologically more advanced? Weber encouraged some prioritization of MODIS' current specifications, before too much effort goes into designing the follow-on MODIS. He noted that some perceive that there are too many specs for one little box to satisfy. Esaias proffered that there is a need for a performance specification for band ratios, not just individual bands.

Taylor reported that there are two persons in NASA Code 170 who are studying the possibility of combining IMASS (which itself is a combination of the AIRS, AMSU, and NSS instruments) and a variation of a pushbroom MODIS onto one platform. Taylor has met with these personnel twice to give them input. He said their study is being funded by John Hraster, deputy director of GSFC's Office of Mission to Planet Earth.

Taylor is also exploring the question Can money be viably saved by using a commercial, off-the-shelf spacecraft?

A spirited discussion ensued regarding prospects for the follow-on MODIS. Salomonson said he has the sense that we can't expect to get more than what we have in the current MODIS. Weber responded that the follow-on MODIS may get better in some respects, but as a whole, it will likely be less. Murphy stated that the Team must strive for improvements, or it may get less. Guenther

suggested that the follow-on MODIS be mapped against the 24 MTPE critical scientific measurements. If a lesser MODIS can still meet those 24 measurement requirements, then that's OK; but if not, then we must not back off. Esaias stated that if we can't expect improvements in MODIS' spectral purity, then those other improvements in resolution and data rate don't buy us anything.

Salomonson feels that it was fortunate for the current MODIS to get 36 spectral bands. The follow-on MODIS may not get as many. Esaias cautioned against lessening the number of bands, stating that new uses are found after launch, and that all 36 bands will be useful in some ways that are not yet known.

## **2.4 SDST Reports**

Masuoka reported that he met with personnel from HAIS (the EOSDIS contractor) and the ESDIS project to discuss what would be required for an early activation of the NSIDC DAAC, and an augmentation of the EDC DAAC to support MODIS testing in Release A. A summary of the meeting will be written by the first week in September by Debbie Blake (ESDIS) and Andy Endahl (HAIS). The summary will then be sent to EDC, NSIDC, and Masuoka for comment. [\*Note: the problems with the slip in Release A delivery have delayed this memo.]

Masuoka had gone to the meeting expecting a telecon with EDC and expressed the concern that since EDC wasn't included via a telecon a memo should be written for EDC to review. The revised memo could then serve as the basis for sizing the Release A systems at EDC which would support MODIS testing.

Masuoka announced that MODIS' Version 1 software integration is scheduled to occur in April 1997, just after MISR's.

### **2.4.1 Computer Outsourcing**

Masuoka said that NASA's Chief Information Officer, Ron West, has mandated the outsourcing of all desktop computing and networking, with the exception of flight critical operations. It is unclear at present if the DAACs and TLCF would be effected by the outsourcing, as the definition of what is a desktop computer has not been clarified.

### **2.4.2 MODIS On-line Browsing**

Masuoka reminded the Team that he sent out an e-mail regard an approach to MODIS on-line browse sizing. He asked the Science Team to review that e-mail and send him any feedback.

## **2.5 Ocean Discipline Group Reports**

Esaias announced that he will have a three-way teleconference with Bob Evans and Mike Jones tomorrow to discuss the Quality Assurance Plan.

Esaias stated that the SIMBIOS Plan is also still being discussed with NASA HQ. The Ocean Group is very dependent upon a good SIMBIOS effort; however, manpower support for that project is not forthcoming, so it hasn't yet been merged with the SeaWiFS Project. Salomonson responded that Joe Rothenberg, NASA GSFC director, wants to consider options of using civil servants before hiring contractors.

Esaias told the Team that Dennis Clark delivered his newest version of MOBY (Marine Optical Buoy) to Hawaii. It is set to deploy on Sept. 15 off the coast of Lanai, HI. The improved MOBY has new spectrometers and new optics onboard, as well as much better software, better cellular transmission capabilities, and a new onboard modem. The new solar panels have been arranged at better angles, and are stronger than previous versions.

## **2.6 MODIS Project Scientist Reports**

Murphy announced that all but four of the semi-annual reports are in. He also stated that the Team is now in the process of missing another deadline in producing its Validation Plan. The Atmosphere Group has submitted its plan, but none of the other groups have submitted theirs. He encouraged the Team to submit their inputs as soon as possible.

## **3.0 ACTION ITEMS**

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### **3.1 Action Items Carried Forward**

1. *H. Montgomery* to have someone summarize the current MODIS specifications and current MODIS testing performance relative to the specs.
2. *L. Stuart and T. Mautino* to argue the case that two weeks is too soon to limit carry over money past the fiscal year.

## **4.0 ATTACHMENTS**

**NOTE: All attachments referenced below are maintained in MODARCH and are available for distribution upon request. Please contact David Herring, MAST Technical Manager, at (301) 286-9515, Code 920, NASA/Goddard Space Flight Center, Greenbelt, MD 20771 if you desire copies of any attachments.**

1. MODIS PFM Test Data Viewgraphs, by Bruce Guenther